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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/911,496	07/25/2001	Robert J. Higgins	211897US99	4428

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1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER

WILLE, DOUGLAS A

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 01/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/911,496

Applicant(s)

HIGGINS ET AL.

Examiner

Douglas A Wille

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Election/Restrictions***

The election/Restriction has been made final and will not be addressed further.

***IDS***

Applicant has submitted three IDSs dated 8 May 2003, 6 November 2003 and 14 March 2003. Since none of these IDSs contain a statement of relevance for each document, as required, they will not be considered.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 4 and 6- 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Guenzer.

3. With respect to claim 1, Guenzer shows a structure (see cover Figure and column 2, line 35 et seq.) with a monocrystalline silicon layer 14 which may be regarded as a substrate if the structure is inverted, a BTO layer and a SiO<sub>2</sub> layer 20 which together are inherently a strain relief layer due to the lack of crystallinity of the SiO<sub>2</sub> and a layer 22 which could be a piezoelectric such as LiNbO<sub>3</sub> (column 3, line 36) and could be acoustic.

4. With respect to claim 2, the semiconductor substrate is Si.

5. With respect to claim 3, LiNbO<sub>3</sub> is a metal oxide.

6. With respect to claim 4, the piezoelectric is LiNbO<sub>3</sub>.

7. With respect to claim 6, the layer 12 is BTO.

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8. With respect to claims 7 and 9, the layer 20 is amorphous SiO<sub>2</sub>.

9. With respect to claim 8, layer 12 is crystalline BTO.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 10 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer in view of Grudkowski et al.

12. With respect to claim 10, Gruenzer shows a structure that could be used for piezo- and acousto-electric interactions but does not specify a device structure. Grudkowski et al. show (see cover Figure and column 3, line 31) a heterojunction acoustic charge transport (HACT) device made of GaAs but the SAW propagating region could be LiNbO<sub>3</sub> (column 7, line 30). It would have been obvious to use the Grudkowski et al. device in the Guenzer structure since it represents a functional device. The Grudkowski et al. device includes a SAW transducer 10 which is a passive device.

13. With respect to claims 11 and 12, the Grudkowski et al. device is a HACT which is an active device.

14. With respect to claims 13 and 14, the charge packets 21 are in the substrate (see cover Figure and column 3, line 53) and are coupled to the acoustic wave.

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15. With respect to claim 15, Guenzer shows that the acoustic device can be combined with circuits in the silicon (column 3, line 33) and it would be obvious to provide an electrical interconnect between the two device parts.

16. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guenzer in view of Kittel.

17. Kittel shows (see page 415) that  $\text{LiTaO}_3$  is a material similar to  $\text{LiNbO}_3$  and has a large polarization. It would be obvious to use  $\text{LiTaO}_3$  instead of  $\text{LiNbO}_3$  as a design alternative since the characteristics are roughly comparable.

***Response to Arguments***

18. Applicant's arguments filed 5/27/03 have been fully considered but they are not persuasive.

19. Applicant states that Guenzer does not show an amorphous layer but note that Guenzer shows (column 3, line 1) that Ramesh teaches to grow the BTO on amorphous silicon dioxide and Guenzer carries out that teaching.

20. Applicant further states that Guenzer shows the silica layer is partially oriented but in fact, Guenzer shows that the silica layer is an insulating layer between partially oriented layers (column 3, line 29) and is not itself partially oriented.

21. Applicant erroneously states that there are four layers in claim 1, but only three layers are claimed and the electro-acoustic device is in the piezoelectric layer. As noted by Examiner, lithium niobate is a well known electro-acoustic material and its use as such would be obvious.

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***Conclusion***

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A Wille whose telephone number is (571) 272-1721. The examiner can normally be reached on M-F (6:15-2:45).

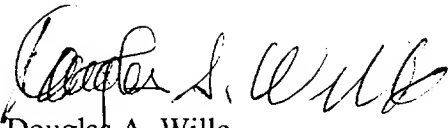
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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Douglas A. Wille  
Primary Examiner

January 7, 2004